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Antibiotics in Public Health

C. D. FARQUHARSON, M.B., F.R.C.P.(C.)
Medical Officer of Health for Scarborough Township
Agincourt, Ontario

THE DISCOVERY of chemotherapy and antibiotics ranks among the greatest of the benefits that have come to mankind, and may be considered the most important event in medicine since the introduction of asepsis and antisepsis by Lister. In the past there has been considerable success in prevention of disease by means of environmental control and by immunization. Now, with the ability to cure, we can confidently expect that most of the infections that have plagued the human race will become things of the past. Already the mortality from pneumonia, scarlet fever, tuberculosis, syphilis, whooping cough and wound infections has been brought to an all-time low.

In giving a definition of an antibiotic, it is difficult to distinguish between a chemical, a hormone, and an antibiotic. A chemical is made from coal tar, dead plants; a hormone from glands of animals; but some hormones have been made synthetically (stilboestrol and cortisone), while antibiotics are made from fungi (living plants). This similarity is important in considering that we need to control the various organisms that grow rapidly in the body to cause disease. These are bacteria, viruses, fungi, and malignant cells.

Not only have bacterial diseases become curable, but a considerable start has been made against the virus infections. Some gains have been made against the fungi, actinomycosis being somewhat sensitive to penicillin. Even some progress has been made against cancer, with both hormones and chemicals. Cancer of the prostate, with its metastases, has been shown to regress both clinically and radiologically when treated with estrogens. The pain goes, health and strength improve, and the lesions in the bones show healing. To a less extent, cancer of the breast responds to androgens and estrogens. Nitrogen mustard, a chemical, has been used with a result similar to radiation therapy.

Presented at the second annual meeting of the Ontario Public Health Association, held in the Royal York Hotel, Toronto, October 1 and 2, 1951.

It is true that none of these have given permanent cure, but a new pathway of investigation has been opened and a treatment of cancer offered different from surgical removal.

The death rate from pneumonia has fallen from its old level of about 35% to about 5% and the deaths have been only in complicated cases. The mortality and even the morbidity from puerperal sepsis is now almost nothing. In surgery similar excellent results have been obtained. Local infections have been cured. Even generalized peritonitis from rupture of a viscus has lost much of its deadliness. And reports from the Korean war are that the death rate in wounded men who reach hospital is now only 2½%.

Effect on the Public: Demand for Medical Care

One result of this progress is that medical care has become an absolute necessity. It means the difference between life and death. Not only does the patient recover, but he recovers promptly, with less disability and often little loss of time and earning power.

The public have been quick to recognize this and demand that medical skill be made available to everyone under the name of national health insurance. There is reason in their view, but it would seem wise to let the medical profession have an important voice in deciding how this service can be organized. The case might be stated in this way. When the doctors have made such an outstanding contribution to the national welfare and have been so successful in prolonging life, the medical profession should know more about the problem than any other group, and they should have an important voice in deciding how the care of the sick can be undertaken.

Effects on the Profession: Changing Position of the Family Doctor

Treatment has become much less personal. A complete stranger may administer an antibiotic and cure the sick person. In this way the patient is not so dependent on the family physician, with his intimate knowledge of the whole background. The public feel this personal loss very keenly, without understanding the reason. They miss the friendly reassurance they have come to expect. Hence one reason for the demand for help from a psychiatrist.

Another effect is that people are much more willing to accept a young doctor, believing that experience teaches less and modern training more.

With the longer life expectancy, chronic illness, often of an obscure nature, will be more important and doctors will have to be able to diagnose more difficult cases. Many diseases that were uniformly fatal have now become curable and must be recognized. A good example is subacute bacterial endocarditis, which is now curable in about 60% of cases. It is the old story that greater knowledge and ability to cure brings greater responsibility to find and treat these conditions in their early stages.

Old Age and Chronic Illness

It has been said that medical science has created old age. Certainly the span of life has lengthened and there are more older people in the population. But the

control of infections has made this group much better able to be useful members of society by preventing the crippling effects of lung and kidney disease, by curing pneumonia and pyelonephritis, so that these people are much better able to carry on with gainful employment. Even some of the hypertension will be prevented with the control of renal infections.

Effects on Hospitalization

Hospital care has become more necessary and often life-saving, but the length of stay in hospital for each individual has been reduced. The problem of chronic illness has arisen. The answer may be more convalescent hospitals, where patients may be rehabilitated. No doubt there will be need for more homes for the aged and infirm.

Effects on Public Health Administration

Quarantine has become less and less important. If a disease can be cured and the carrier state terminated, it is more scientific to provide medical care than to enforce isolation. One of the best examples is scarlet fever. Although the streptococci can be cleared from the throat quickly with penicillin, the law requires isolation for three weeks. It is difficult for the health officer to explain this to the medical profession.

Isolation Hospitals

Isolation hospitals have become less important in the community and will likely be replaced by isolation wings in general hospitals. Not only will this be more economical, but it will provide better training for young doctors doing their internships who at present have no opportunity to see communicable diseases before starting practice.

Effects on Venereal Disease Control

The treatment of venereal disease has become so effective that when a patient with gonorrhoea is given one injection of penicillin he is usually cured before the notification reaches the medical officer of health in the mail the next morning. Similarly, in syphilis one injection will make the patient non-infectious, and in some clinics an experiment is being done to see if one massive dose of penicillin will cure the primary disease. It has become difficult to distinguish between relapse and reinfection.

Effects on the Laboratory

The bacteriological laboratory has assumed a new importance. Very often it is necessary to identify the causative organism and estimate its sensitivity in order to choose the proper antibiotic. This information may mean the difference between success and failure; hence the hospitals are recognizing the value of the pathologist.

Problems of Resistance

Resistance to an antibiotic may be natural in some strains of bacteria. Colon bacilli are not only insensitive to penicillin but produce penicillinase which

reduces the action of the penicillin to mixed infections where colon bacilli are present. Yet these same infections may respond to treatment with aureomycin, chloromycetin or terramycin.

Acquired resistance occurs when a strain changes its character and no longer responds to the antibiotic in use. This change may occur slowly with penicillin but rapidly against streptomycin; hence the need for adequate dosage early.

Resistance may be mechanical. As a general principle, antibiotics will not take the place of surgical drainage, and local collections of pus must be opened. Obstruction in tubes, as in the urinary tract, must be relieved. Dead or devitalized tissue, foreign bodies, and dead spaces must be dealt with.

A disturbing effect of resistance is the appearance of penicillin-resistant staphylococci, particularly in patients in hospitals. They cause all the ordinary staphylococcic infections, and a number of hospitals have reported a very troublesome type of impetigo of the newborn in their nurseries. For this Dr. Thorn of Boston has reported success by bathing the babies with phisoderm.

Choice of Antibiotic

Some information is necessary before an antibiotic can be administered intelligently to cure disease.

1. Know the causative organism and its sensitivity. This may be learned by clinical examination to determine the disease and to estimate its probable cause. Further identification may be made by direct smear and confirmed by culture and sensitivity tests of organisms from sputum, blood, urine or other discharges.
2. The toxicity of the antibiotic. Choose the least toxic.
3. The ease with which it may be given, by mouth or by injection.
4. Its ability to reach the organism. Sulfonamides will cross the blood brain barrier much more readily than penicillin. For this reason, sulfonamides may be given in meningitis.
5. Its cost to the patient.

Another problem of the future may be the masking of infection by the administration of ACTH and cortisone and the danger of the disease flaring up acutely when the treatment is stopped.

Fields of the Various Antibiotics

The Sulfonamides

Although the sulfonamides are being rapidly displaced by penicillin, either sulfadiazine or gantrisin is still the choice in uncomplicated urinary infections, bacillary dysentery, and meningococcic meningitis.

The danger of toxicity is not great provided the patient maintains a good urinary output. Gantrisin is said to be more soluble and less toxic than the others.

Effects on the bone marrow are serious but not common.

Penicillin

Penicillin is active against most gram-positive bacterial infections and spirochetes, against some gram-negative cocci, the gonococcus and the meningococcus, and against *Rickettsia psittari*. It is not active against most gram-negative organisms, and the colon bacillus even produces penicillinase. For this reason,

penicillin is being replaced in the treatment of mixed infections like peritonitis by aureomycin, terramycin or chloromycetin.

At present penicillin is the most popular antibiotic. Its toxicity is very low and it has a wide range of effectiveness. It used to be considered necessary to maintain a constant high blood level but this is now being questioned. There also appears to be a selective absorption of penicillin in inflamed tissue. This provides an active reserve against the infection.

It may be administered intramuscularly as crystalline penicillin, with its quick rise in blood level and rapid excretion; or, more usually, in a slowly absorbed form, procaine penicillin in either oil or water. Oral administration requires three to five times the amount given intramuscularly and its absorption is irregular and unpredictable.

In cavity infections like empyema, crystalline penicillin may be injected, 50,000 units in 500 cc. after aspiration of the fluid, and in septic joints 10,000 units in 5 cc. into the joint space after aspiration.

Intrathecally a dose of 10,000 units may be given in meningitis. A nebulizing spray is used in such diseases as bronchiectasis.

An ordinary intramuscular dose is 300,000 units of procaine penicillin once or twice a day. Some doctors prefer to use 300,000 units of procaine penicillin with 100,000 units of crystalline penicillin under the name of S.R. penicillin, especially for fulminating infections.

Streptomycin

Streptomycin has its greatest value in the treatment of tuberculosis when it is given in combination with para-amino-salicylic acid, which delays the development of resistance to streptomycin. It is also valuable in the treatment of sub-acute bacterial endocarditis when it is given along with penicillin for some resistant infections.

Aureomycin, Chloromycetin and Terramycin

These may be considered together because their spectrum is similar and broad. They are effective against pneumonia and other respiratory infections, urinary tract infections, cellulitis, abscesses and peritonitis, as well as penicillin-resistant infections, and against brucellosis as well as some viral and rickettsial diseases. They are said to be effective in amoebic dysentery. Chloromycetin is effective against typhoid fever. There is some evidence that this group of antibiotics is effective against whooping cough.

They have several advantages: low toxicity, broad spectrum against infecting organisms, and good absorption when taken by mouth. The dosage is two to four grams a day in divided doses every four to six hours. Their action is bacteriostatic and not bactericidal, and patients may be left in the carrier state. Intravenous preparations are available for aureomycin and terramycin.

Reactions

Penicillin

Reactions are usually minor, often urticaria which disappears when the drug is stopped. Occasionally there may be an extreme degree of sensitivity, as shown

by a recent report of a patient dying of an allergic reaction after an injection of penicillin. Reactions may become more frequent as more people become sensitized by previous treatment. This makes it necessary to enquire about any previous reactions to antibiotics before administration and to give them only when clearly indicated.

As an ointment, penicillin or other antibiotic may cause various types of skin reactions, and contact dermatitis may appear on the hands of nurses exposed in the administration of these drugs.

Given intrathecally, penicillin may cause convulsive phenomena.

Aureomycin, Chloromycetin and Terramycin

Any of these given by mouth may cause nausea and vomiting. This may be prevented by giving them with milk.

They may allow an overgrowth of monilia in the intestinal tract, associated with diarrhoea and colitis or proctitis. Some observers have compared this with sprue and recommend treatment with liver extract, vitamin B12 or folic acid. Black tongue may appear, usually when penicillin lozenges have been used, and occasionally after injections.

Streptomycin shows its greatest toxicity on the 8th nerve, with vertigo, tinnitus and deafness. This has been much less evident since smaller doses have been used. Occasional deaths have been reported from toxic encephalopathy and from exfoliative dermatitis.

Specific Diseases

Pneumonia

Between 90 and 95% of pneumonia is caused by the pneumococcus, which is sensitive to penicillin. The remaining cases are mostly due to organisms like the streptococcus, the staphylococcus, or Friedlanders' bacillus. There is also atypical pneumonia, which may be sensitive to aureomycin, chloromycetin or terramycin.

Influenza

There is no evidence that epidemic influenza is sensitive to any antibiotic, but many physicians have given various antibiotics to prevent secondary infections with pneumonia.

Rheumatic Fever

No antibiotic is of value in the treatment of rheumatic fever, but there is some evidence that penicillin given early in streptococcal throat infections will prevent the appearance of either rheumatic fever or glomerulonephritis. Because rheumatic fever tends to show relapses with added cardiac damage, rheumatic patients may be given either sulfadiazine or gantrisin in doses of one gram a day, especially in winter months. Penicillin has been recommended for the same reason, either 800,000 units by mouth seven days a month or a smaller dose by injection.

Syphilis

The results of treatment have been so good that it has become difficult to distinguish between relapse and reinfection. As patients now desire to complete their treatment, there is less difficulty with follow-up work.

The Toronto schedule for treatment is as follows:

Primary syphilis: 600,000 units of procaine penicillin three times a week for two weeks.

Secondary syphilis or syphilis in pregnancy: 600,000 units three times a week for three weeks.

Latent syphilis, neurosyphilis and cardiovascular syphilis: 600,000 units three times a week for four weeks.

Follow up requires quantitative blood and spinal Wassermann tests, spinal fluid cell counts, total protein determination, and colloidal gold curve.

As a precaution against a Herxheimer reaction in late syphilis it is customary to give 10 grains of potassium iodide three times a day for one or two months before starting penicillin.

Gonorrhoea

The ordinary amount given is 300,000 units of procaine penicillin to a man and the same amount repeated two or three times to a woman. This may be repeated if there is a relapse. These patients should be followed for some time because about 1% of them will contract syphilis as well as gonorrhoea and need further treatment.

Tuberculosis (schedule of Toronto Hospital, Weston)

Streptomycin is valuable in tuberculosis of the exudative type and may be life-saving in miliary tuberculosis and tuberculous meningitis. In surgery of the lung it is used when spread of the disease is shown after thoracoplasty; and when lung resection is required, it is given before and after operation. It is valuable in bronchial and laryngeal tuberculosis.

It is being used experimentally in people with pleurisy with effusion to prevent involvement of the lung parenchyma, because in the past about 25% of these patients developed pulmonary tuberculosis.

In renal tuberculosis and infections of the urinary tract it is given when pyelograms show no deformity of the renal pelvis.

It is of little value in fibrocaseous tuberculosis. This might be expected with multiple cavities draining pus. It does not shorten the stay in sanatorium because cure depends on the development of immunity by the patient, but it does help to control the disease in many patients.

The usual dose of streptomycin is one gram twice a week for 120 days with 10 grams of para-amino-salicylic acid a day. Under this régime resistance develops slowly and only about 25 per cent of patients show resistance. In acute emergencies like miliary tuberculosis and tuberculous meningitis larger doses are given, up to two grams a day, and streptomycin may also be given intrathecally, 25 to 50 mg in normal saline.

Meningeal Infections

Great progress has been made in the treatment of bacterial meningitis. Success depends on early diagnosis with accurate information about the infecting organism. The prognosis has changed, and instead of being almost always fatal a cure can be expected in many cases. A combination of drugs is often useful.

Meningococcus meningitis: sulfadiazine and penicillin

Pneumococcal meningitis: sulfadiazine and penicillin. Penicillin may be given intrathecally at first. The results have been uncertain, probably because of the formation of fibrin deposits over the brain.

Influenza

Sulfadiazine and streptomycin have been used with good success, but there is some evidence that sulfadiazine and chloromycetin may be better.

Smallpox

During the recent epidemic in Glasgow, patients were given penicillin for the secondary fever, with good results. No antibiotic has yet had any effect on the virus itself.

Typhoid Fever

Chloromycetin causes a rapid improvement in the clinical condition of the patient, although there have been reports of relapses when treatment was stopped. The carrier state may continue after clinical cure.

Sub-acute Bacterial Endocarditis

This disease is now curable in about 60% of cases by means of large doses of penicillin — a million units or more a day, depending on the sensitivity of the organism. Some resistant organisms will require streptomycin or other antibiotic in combination.

In summary, it has been found that the entire concept of the treatment of infectious diseases has changed completely with the introduction of antibiotics. Almost every form of treatment more than three years old is already obsolete.

From the standpoint of public health, it appears that the object for which health departments were formed, the control of the infectious diseases, has been largely achieved. If public health is to continue to make progress and not stagnate, it will have to put more energy into the prevention of chronic illness and the diseases of middle life and old age. These are increasing in importance with the added span of life. The same energy that has controlled the infections must in the future be used by the medical profession to deal with the problems of the older age group.

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Cancer of the Breast: Invalid Evidence of Increase

N. E. McKINNON, M.B.
Department of Epidemiology and Biometrics, University of Toronto

THE evidence of an increase in breast cancer apart from that due to ageing of the population, as presented by Professor Rupert A. Willis in his Pathology of Tumours,[1] requires examination. Quoting data of 1911, 1920 and 1930 for the U.S.A. Registration Area of 1910, Willis says:

"This table shows that in the United States of America (and the same applies to England and many other countries), the crude mortality rate of breast cancer has risen markedly during recent years, and that this rise is due in large part to the ageing of the population. That it is not wholly due to this, however, is shown by the upward trends of the standardized or age-specific rates also. The ratio of breast-cancer to total-cancer deaths has also shown an upward trend, e.g., in the U.S.A. this rose fairly steadily from 7.3 per cent in 1900 to 9.5 per cent in 1930 (Bogen); and this in spite of the fact that while improved diagnosis must have caused an increase in registered deaths from internal cancers, breast cancer could have shared but little in this improved diagnosis. It appears clear then that there has been a real increase in the prevalence of breast cancer, quite apart from its increase because of ageing of the population."[1]

Fallacy in Upward Trends of Standardized Rates

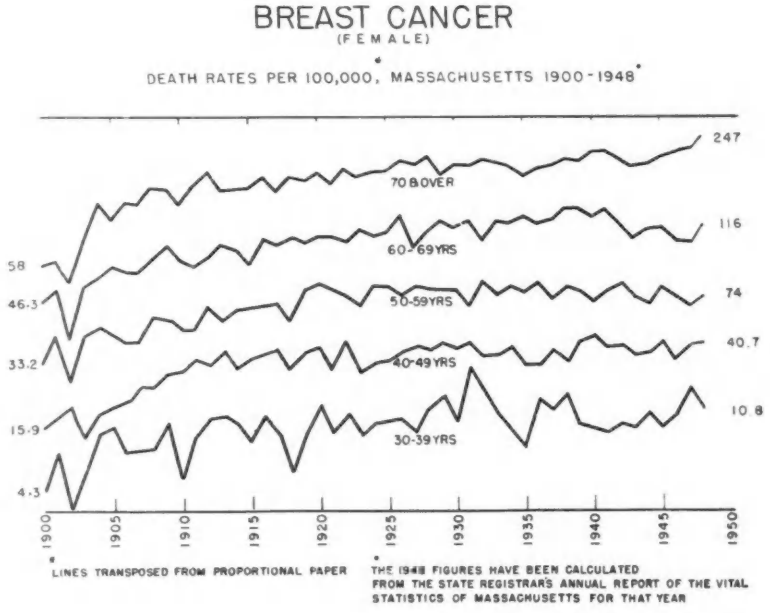
Standardized rates, it will be remembered, are not free from the weaknesses of age and sex specific rates on which they are based; those weaknesses are mentioned in the next paragraph. In addition, when standardization fuses different trends of different age groups, it may totally obscure important features and distort the picture. Standardized rates are thus susceptible to wrong interpretation and may be misleading. Moreover, the Registrar General of England and Wales has referred specifically to the limitations of standarized rates in cancer studies: "The study hitherto made of mortality trends for cancer sites by means of standardized rates at all ages combined was of limited value since it obscured great differences in the behaviour of rates at different periods of life, and these may be important in any attempt to elucidate the causes underlying the trends."[2] Thus, an upward trend in standardized rates is not to be accepted as conclusive evidence of a real increase in breast cancer apart from that due to ageing of the population.

Artificial Nature of Increases in Age-Specific Rates

Even age and sex specific rates, even those for breast cancer, have their limitations. They are constantly liable to changes, tangible and intangible, even in diagnosis, but more especially in certification and book-keeping. Over any long

period of time such changes are inevitable, even in breast cancer, and the effect varies in different age groups. Therefore, in view of the nature of the rates, comparability of them is always suspect until indubitably established as reasonable. No change in rates can be accepted with assurance as real when that interpretation is not compatible with or is even difficult to reconcile with what is known of the nature of the case, when at the same time the change is reasonably attributable to paper factors. For instance, in the Canadian data,[3,4] neither the abruptness of some of the increases nor the inconsistency of longer increases in breast cancer mortality rates could be reconciled with what is known of the history or nature of breast cancer. The fact that neither of these increases was reflected in the age-specific rates of mortality from all causes suggests their artificial nature. Further, the increases coincided with decreases in the deaths charged to non-specific causes, such as senility and ill-defined causes, with some decrease in deaths charged to cancer with no site specified and with some increase in deaths charged to cancer as a whole. These relationships in the rates thus indicate clearly a shift, possibly in diagnosis but, more particularly, in certification and book-keeping, deaths previously charged to non-specific causes being charged in later years to specific causes including cancer and deaths charged to cancer with no site specified being charged to cancer of specific sites including breast. The increases in the breast cancer rates can then be attributed with full confidence to artifact. The U.S.A. rates for every year, as would be required for a fair appraisal of their character and trend, are not at hand, but the rates for Massachusetts have been kindly supplied by Dr. Herbert L. Lombard, Director of the Division of Cancer and Other Chronic Diseases in the State Department of Health. Massachusetts, it will be recalled, was one of the two States which, with the District of Columbia, formed the original Registration Area of 1880. Its rates should have a greater degree of comparability than those of the combined States of any Registration Area or of the U.S.A. as a whole. They are shown in the accompanying graph. A glance at the graph shows that in the first decade of the century and particularly in the first few years, 1900-1905, the rates in different age groups showed irregular but abrupt increases and tended, then, by the second or third decade to level off or, in some, especially in older age, to maintain for a longer time some incline. The abruptness of the early increase, at variance with what is known of the natural history of cancer, indicates that even these rates are not without their vagaries and immediately suggests artificiality. So, too, does the inconsistency of the longer increases. The Massachusetts data of all mortality, of all cancer mortality, of senility, of ill-defined causes, etc., are not at hand for possible identification of any changes that might coincide with increases in the breast cancer rates. There is no reasonable doubt, however, that increases so similar in character to the Canadian increases, though occurring at a different time, would have a similar cause—a paper shift to greater specificity in cause and in site. Such a shift is compatible with general experience and reflects advance in medicine and its book-keeping over the years. There is then no reason for assuming that the rates of any Registration Area or of the U.S.A. as a whole would give any more

reliable evidence of a real increase in breast cancer than do the Massachusetts rates. Nor can any rates be entirely exempt from such artificial factors as noted, although some greater degree of continuity and uniformity in the book-keeping of the English data (until 1939[5]) may have obviated, somewhat, the more abrupt changes. Thus, increases in age-specific rates of breast cancer mortality are not infallible evidence of a real increase apart from that due to ageing of the population.



Spurious Quality in the Increase in Breast-Total Cancer Ratio

The increase in the ratio of breast cancer to all cancer mortality might, on the surface, inspire more confidence than the increase in the recorded age-specific rates or in standardized rates; but this needs some scrutiny too. One of the main premises for attributing significance to this increase is evident in the statement that the rates "rose fairly steadily from 7.3% in 1900 to 9.5% in 1930." Both the figures and the graph presented by Bogen[6] show clearly, however, that the increase was not "fairly steady" but was abrupt, though irregular; it carried the ratio from 7.3 per cent in 1900 to 8 per cent in 1901 and from 8.3 per cent in 1907 to 9.1 per cent in 1908, and then, with another sudden jump, from 9.2 per cent in 1913 up to its highest point, 10.1 per cent as early as 1914, from which point the ratio quickly dropped back to around 9 per cent with continuing wide but irregular fluctuations. Thus the increase lacks the steadiness which was assumed in the premise and which would be more suggestive of reality. Neither in the abruptness of the increase nor in its magnitude could it be related causally,

in any large part, to the decrease in the birth rate, the factor advanced by Bogen as principally responsible and so accepted, apparently, by Willis. Here again the shift in the records from cancer unspecified by site to cancer of specific sites, including breast, explains the increase. In addition, and as Bogen and Willis both realized, a change in the age distribution of the population could contribute to a change in the breast-total ratio; so, too, could the variation between different age groups in the effects of changes in diagnosis, certification and book-keeping. Thus, the increase in the recorded breast-total ratio is not sound evidence of a real increase in breast cancer.

In conclusion, then, neither the increase in the standardized rates, nor that in the age-specific rates nor that in the breast-total ratio as cited by Willis provides any sound evidence of an increase in breast cancer apart from that due to ageing of the population.

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Letter from Great Britain

The Medical Officer of Health in Great Britain (VII)

CARE AND AFTER-CARE

FRASER BROCKINGTON
M.R.C.S. (Eng.); L.R.C.P. (Lond.); D.P.H.; B.Chir., M.D. (Camb.); M.A. (Camb.); Barrister-at-Law

Professor of Social and Preventive Medicine
University of Manchester
Manchester, England

SOMEWHAT tardily we have come to recognize that treatment in hospitals is only half the battle. In the tranquil days before 1946 a hospital was a monastic institution; patients entered its portals into another world to find that nobody was very concerned with what they did outside or how they lived; and when their belongings were once more in their suitcases they said goodbye to the other patients and the staff, returned to the outside world and were forgotten by the hospital. The loving care with which they had been treated, the many investigations and the time and thought which had gone to the making of a diagnosis, was often wasted for want of proper application; but that seemed to have little importance so long as the cost of hospitals was largely borne by voluntary subscriptions.

The year 1946 did, of course, many drastic things to medicine, some of which we have already studied. One of the less well understood side-effects of the upheaval has been the altered emphasis upon the importance of social work both in hospitals and outside. Public health will, in fact, experience no greater advance than that which can come from the development of "care and after-care" as an expression mainly of Section 28 of the National Health Service Act, 1946. This section said: "A local health authority may with the approval of the Minister, and to such extent as the Minister may direct shall, make arrangements for the purpose of the prevention of illness, the care of persons suffering from illness or mental defectiveness, or the after-care of such persons, but no such arrangements shall provide for the payment of money to such persons, except in so far as they may provide for the remuneration of such persons engaged in suitable work in accordance with the arrangements." The object is speedy and effective rehabilitation as one of the principal aims of public health. This new branch of the Medical Officer of Health's work is not primarily concerned with

treatment but in the solution of socio-medical problems; his interest lies in furnishing the doctor and the hospital with good background reports and in solving difficulties and making adjustments in the patient's life without which there can be no complete response to treatment.

It will be many years before this new work can be fully developed, but despite dissension the past few years have seen notable advances. The final goal is to bring the resources of the health department to the assistance of all patients in need leaving hospitals of whatever size, type or situation: general and special hospitals, maternity homes, mental hospitals, mental deficiency colonies, long-stay hospitals for children, sanatoria, and hospitals for the chronic sick. Each presents its own peculiar features. But in general the work falls in all hospitals into three sections: that within the hospital, the provision of background reports, and the care after leaving hospital. As to the provision of background reports, every health department has in its possession, or available to it, a wide range of information which may help hospital staffs in diagnosis and treatment. The health department is responsible for community health; the whole of the hospital clientele come from, and go back to, the community. The environment and personal details known to the sections responsible—for example, care of mothers and young children, school health and mental health—are of the first importance. The Medical Officer of Health is able to mobilise information available from medical men and women and medical auxiliaries employed by the health department; for example, school doctors, school dentists, sanitary inspectors, home nurses, midwives, health visitors, mental health workers and child guidance staffs, so that it can supplement the information obtainable from the general practitioners. Such a report can give a picture gained from impressions and observations over a continued period of far greater value to the hospital than that provided by single visits to the community by hospital staffs. The Medical Officer of Health should be a familiar figure within the hospital precincts.

The illnesses of all ages and classes are often closely related to the circumstances of life and work in the community; these must be attended to if the benefit from hospital care is to be maintained. The care and after-care of the tuberculous was the earliest example of the development of attention to the social aspects of hospital treatment; this idea is capable of much wider application. The weakly and premature infant cannot survive in a bad home, and before its discharge the health department must have an opportunity to put things right or find alternate means of care; the child handicapped by epilepsy, heart disease, diabetes, deafness, crippling defects, or indeed in any manner, must be assured of special arrangements for education and continued supervision at school; mothers going out of a hospital or maternity home before the fourteenth day will need the care of a midwife at home; many of those who have had operations and others will need special nursing care by a home nurse, who must be made familiar with what is required; many adults suffering from permanent handicaps must have assistance in overcoming them and guidance to find suitable employment; the chronic sick, particularly when age is beginning to tell, and many other hospital patients have home worries and home problems for which

an answer has somehow to be found and for which the Medical Officer of Health, with the assistance of his team, may be able to find an answer. It may be the state of the house or the drains, or overcrowding, or the rapid growth of a young family or lack of domestic help, or there may be bad parental management, faulty housekeeping or hygiene at the root of the trouble. The possible contributory causes of illness and ill-health are, of course, very great indeed, but whatever they may be the object of this scheme is to ensure that the health department, in full collaboration with the doctor, shall help to remove them. The link between the hospital and health department can produce other beneficial results. In the case of infectious disease, notifiable or non-notifiable, if the health department is consulted it is often possible to take steps to protect the family and the community. Moreover, when patients fall ill and have to enter hospital the physical and social aspects of the home (wholly or partially the cause) are often revealed for the first time and care for these may protect other members.

Sociological work within the hospital itself is the concern of the hospital, but it is clearly undesirable to separate it from other aspects. In larger general hospitals it is usual to employ an almoner; she can be helped by background reports obtainable from the health department, whose staff can attend for personal consultation. In smaller hospitals and special hospitals, particularly for the chronic sick and the tuberculous, where there is no almoner, the most practical solution is for the health department to undertake the work through a senior and experienced health visitor. This, in fact, takes care and after-care to the bedside.

In devising machinery to meet this work the first essential has been to establish convenient methods of transmitting confidential information from hospitals to health departments. An unobtrusive start was made with this under the Education Act, 1944, when, in return for payment for free treatment of children, hospitals agreed to pass on information about admissions and discharges with a confidential report. The experience gained under the Education Act was invaluable to later developments. School health records were seen to be more complete in essential details and the school medical officer for the first time was able to follow up school children and relate hospital findings to the school and the home and eventually was better able to advise on juvenile employment when the time came for child to leave school and enter industry. Somewhat oddly, this first tentative excursion on the ice, like that of Mr. Winkle, if not very spectacular, yet had no ill-effects; it was only when Mr. Pickwick arrived on the scene in the guise of the National Health Service Act that the ice gave way. Nothing, indeed, so far experienced under the new machinery has been so difficult to overcome as the reluctance of the medical profession to operate any scheme which entails the transfer of information to the Medical Officer of Health. This, mistakenly regarded as a breach of confidence, has been only reluctantly and partially accepted following government Circular R.H.B. (50)22, which said:

"It is generally agreed that the family doctor should have early information on the discharge of a patient from hospital and should make arrangements with the Local Health Authority for services such as home nursing, domestic help, etc. There are, however, cases

where direct information, including any necessary medical details, should pass from the hospital to the Local Health Authority, in order to avoid a break in the services provided, e.g. in the provision of special nursing requisites for paraplegics, or more simply to arrange for immediate home nursing attention or domestic help. Such arrangements should of course only be made with the patient's agreement and the family doctor should be informed that arrangements have been direct with the Local Health Authority. A form agreed regionally for transmission of this information would be useful."

At first hospital specialists and general practitioners opposed any transfer of information; more recently the opposition has mainly been from the family doctor, who looks upon it as an interference with the doctor-patient relationship. No doubt the opposition will slowly disappear as the benefit to all parties is better understood, but the extent of the opposition can be gauged by the recently expressed views of the Leeds Branch of the British Medical Association, as follows:

"The proper procedure should be that the Hospital should report direct to the general practitioner only and he should be responsible for requesting the Local Authority to provide 'after care' where necessary. In exceptional cases where delay might be injurious to the patient, the Hospital might request the Local Health Authority to provide services, informing the general practitioner that this has been done. The strongest objection should be offered to the proposal that Hospital Authority should send reports of cases discharged to the Medical Officer of Health or School Medical Officer. The Committee considered that the disclosure of details, including the diagnosis of any patient to anyone but the patient's own doctor, was a breach of professional ethics."

With these views before them, the West Riding Executive Council decided on the 5th April, 1951, to send the following resolution to the Leeds Regional Hospital Board:

"That this Committee concur in the views of the Leeds Branch of the British Medical Association and the West Riding Local Medical Committee, and that the Leeds Regional Hospital Board be informed accordingly."

Yet much progress has been made in different parts of Britain. The appendix gives in detail an agreement entered into with a hospital management committee in a coal-mining area (since extended to a wide range of hospitals in South Yorkshire). A simple form in three sections is used, which includes one part to send to the health department if a background report is needed and another to be sent on discharge, when some form of after-care is needed, simultaneously to the family doctor and the health department. One valuable side effect of this formal notice of discharge has been its receipt by the family doctor in advance of the customary discharge letter; many doctors have remarked that they no longer experience the embarrassment of learning by hearsay that one of their patients has arrived home. Schemes of this kind, with suitable modifications to meet local circumstances, are likely to become widely used.

A formal notice is, however, hardly enough when the subject matter so closely concerns human happiness. The arrival of the ambulance at the door or the receipt of a hospital-admission note is fraught with the possibilities of human suffering. We must not fall into the error of the Poor Law of subjecting human feelings to inhuman procedures. We must try to make personal links and give personal attention. Attempts to secure a personal link with hospitals have

led to the development of the hospital health visitor. This work began in the City of Cardiff (240,000 population) in 1944 with a hospital follow-up scheme for diabetics, by two whole-time health visitors who visit the hospital weekly to discuss the after-care of individual patients with the doctor, ward sister, dietitian and almoner. A copy of the discharge letter to the general practitioner is sent to the health visitor, who visits the patient in the home as soon as possible to see that the regime recommended in the hospital is carried out. As Dr. Greenwood Wilson, Medical Officer of Health for the City, has said: "It has been found that although printed instructions are given of all essential matters . . . it is necessary to follow up by a home visit. Many patients find difficulty in measuring their correct dosage of insulin. . . . All this is explained and the patient reminded of the tuition he has had in hospital on injection technique, how to recognize early signs of hypoglycaemia, and the necessary precautions to be taken on occasions involving extra activity. . . .". In 1948, before the transfer of hospitals under the new Act, I introduced this arrangement on a wider basis to a general hospital under the West Riding County Council. A senior health visitor was attached to a general hospital of 260 beds "with the two-fold object of providing the hospital with a social worker for almoning work within the hospital and to determine what types and numbers of patients would benefit from a background history, how many need supervision in hospital and those for whom social work and rehabilitation are needed after leaving hospital." It was found that during the first six months, of 400 patients admitted (116 children and 284 adults), background histories were required for 40 children (34 per cent) and 60 adults (21 per cent); about 30 per cent were helped during their stay in hospital in the solution of various worries and troubles, themselves a contributory factor of the illness; 118 patients (29 per cent) (old age pensioners, gastric, diabetes and kidney cases, and malnutrition, bronchitis and cardiac cases) required some form of care and after-care from the health department. This scheme has now been in operation for three years, during which time 2,069 patients have been interviewed; 589 interviews with relatives visiting the hospital; 365 home visits by health visitors were arranged, and 269 social background reports submitted; 323 patients were referred for further follow up on discharge. The Medical Superintendent reported as follows:

> "The services of the hospital health visitor are regarded as invaluable by the medical and nursing staff and by the patients. The work is time-consuming and cannot be carried out by a member of the hospital staff. It has often been noticed that when the health visitor has interviewed a patient at the request of the medical staff several other patients in the same ward have asked for an interview with her and have almost invariably received some benefit."

During these three years the arrangement (which has the outstanding feature that it takes care and after-care to the bedside and brings a link without any intermediary between the hospital patient and the health department) has been extended widely to cover other general hospitals of varying size, and to institutions for the chronic sick and to maternity homes. The following reports of the secretary and senior surgeon of a hospital management committee (see appendix) are given in illustration:

"Miss X, a West Riding County Council health visitor, commenced duty at the Hospital on 10th May, 1949, and has been attending regularly three half days each week on Tuesday, Wednesday and Friday afternoons. During this time she has visited patients on the wards and on one half-day each week has been available to interview patients' relatives, and deal with any personal problem they may have in their home life which affected the patient's illness, or arising as a result of the illness. The attachment of Miss X to the hospital has been of great benefit to patients and has provided the link between the hospital service and the after-care arrangements of the local health authority, which is necessary to ensure the essential 'follow-up' and continued supervision of a patient on discharge from hospital. Cases which required the attention of a Home Nursing Service, the provision of an appliance outside the scope of the hospital service, and rehabilitation, were readily undertaken by Miss X and necessary arrangements made. The work performed during the past six months has been greatly appreciated by the medical staff, and the Senior Registrar strongly supports the continuance of the scheme. It would be appreciated if the time allocated could be extended to allow for contact being made with the hospital every day. Miss X has stated that she could have done a lot more work if the time had been available. It is considered that this liaison is extremely valuable and should be extended wherever possible."

Statement of the Senior Surgeon:

"The work carried out has been I think very successful. I would greatly appreciate from my point of view, if the time could be extended to allow for contact with the hospital on every day of the week. The appointment of a Hospital Health Visitor has forged a further link between the hospital and the home, and has been instrumental in facilitating our work in the Hospital in many ways. The main factors are, of course, the assistance provided through the scheme for the follow-up of hospital treatment in the home, a matter in which I would emphasise the very good work done in the treatment of stabilised diabetes, either by the actual home treatment by the District Nurse under the direction of the family practitioner, or by teaching and supervision of self-injection. Other factors are the facilitation of discharge of patients and consequently a quicker turn round of bed vacancies in the hospital. This quick discharge of patients is greatly assisted by the knowledge that home treatment is being carried out under the efficient supervision of Public Health Nurses under the direction of the family practitioner. In addition, the knowledge of environmental and socio-medical conditions, obtained as necessary, by a Health Visitor on the Care and After-Care Form Part A, gives an impartial picture of the home conditions.

"The early discharge of maternity cases can also be of great assistance, and information regarding home conditions constitutes to a great measure a guide when cases of this nature are discharged prior to the fourteenth day. The Hospital Health Visitor has also assisted materially in many other instances of which the following indicate the type. Rehabilitation of patients: several cases necessitating rehabilitation in the form of changes in employment have been negotiated directly and successfully through the local office of the Ministry of Labour. Also a family of four children have been placed in County Homes to facilitate the mother's admission to hospital for urgent mastectomy; home visits were carried out by the Hospital Health Visitor with regard to investigations required for the provision of convalescent home treatment under the Regional Hospital Board; the provision of nursing equipment for the home in a case of spinal paraplegia and the subsequent arrangements for the nursing and occupational therapy; home visits to the aged following discharge from hospital—subject to suitable home condition, following treatment for fractures, and the negotiations with the Local Health Authority for the provision of a domestic help. . . . This scheme can be furthered to the extent of allowing a permanent contact to be made with the Local Health Authority through a Hospital Health Visitor each day of the week, as I feel that there is much work that can still be done in this sphere."

An account of the scheme, developed on the same lines, in relation to a maternity home in a teaching group of hospitals was published in the British Medical Journal of June 2, 1951.

Care and after-care in relation to general practice is of equal importance. This has been made possible by section 24 of the National Health Service Act (extending the duty of health visitors to the 'giving of advice as to persons suffering from illness'); section 25 (home nursing); and section 29 (home helping). The rehabilitation of the sick in their own homes is of growing importance, not only because by this means the life of the community can be supported without undue elaboration of institutions, but also because this ensures that the family doctor is enabled to practise his art to the full and because it is one of the most effective means of securing economy in our health services. The work of the Medical Officer of Health and his staff in promoting this can, course, be effective only in circumstances where there is a close partnership with the general practitioner. In the past there has been rivalry and some misunderstanding between health departments and the general practitioners. This is now rapidly disappearing and the work of the health department is increasingly seen as an indispensable aid to the work of the family doctor. In particular the health visitor can now be regarded as the all-purpose worker in the socio-medical field; acting as an agent for care and after-care (under Sec. 28) and in carrying out her new functions of giving advice in sickness (under Sec. 24), she can act as the right hand of the general practitioner dealing with the social circumstances which contribute to illness and acting as a teacher to interpret the meaning of the doctor's diagnosis in terms of the patient's life at home and at work. On a rough computation there are now two doctors to every health visitor in Britain. The time must come when the work of health visitors will be arranged to coincide with the families of one or two doctors and when every family doctor will look to them as an indispensible ally for his patients nursed at home in much the same way as is now developing for patients discharged from hospital.

The home nurse has an equally great contribution to make to the problem. Home nursing, as developed in the first half of the century, has concerned itself mainly with the chronic sick. This is work of the first importance but our object must now be to secure that it becomes equally available to all sick. The past three years has seen extension in amount and scope. In one division in South Yorkshire, in which the efforts of voluntary organizations had previously hardly extended, three thousand home visits in 1947 was increased to 33,700 in 1950. Here again the family doctor has much to gain, for it is imperative that he should be relieved as far as possible of routine duties which can be equally well done under his guidance by a nurse, in order to give himself time to concentrate upon the problem of diagnosis and treatment.

The home nurse and health visitor, working in close partnership, must be supported by the home help in the management of the home. The National Health Service Act, 1946, made such provision a statutory (but not an obligatory) responsibility of the health authority; section 29 says—"A local health authority may make such arrangements as the Minister may approve for

providing domestic help for households where such help is required owing to the presence of any person who is ill, lying-in, an expectant mother, mentally defective, aged, or a child not over compulsory school age within the meaning of the Education Act, 1944". This service (which has grown out of the maternity home help first introduced in 1918 and extended during World War II to cover sickness) made little progress, for reasons not easily understood, until the National Health Service. Since then it has had a mushroom growth; it is now running at an approximate total cost for the country of £2½ millions; in itself a small sum in terms of the vast expenditure of the health services but nevertheless large enough to indicate a widespread appreciation. Without the services of the home help the rehabilitation of the sick in their own homes is difficult or even impossible, particularly for the aged and in families where there are young children. The Minister approved for the West Riding of Yorkshire the employment of 310 (since raised to 500) whole-time helps (or the equivalent in part-time). This quota has been divided among the 31 divisions on a population basis, and the recruitment, supervision and day-to-day administration is under the general control of the Divisional Medical Officer. It was early found to be necessary to define which people are eligible for the service. The home help is neither a nurse, a sitter-in nor a char, but it is still difficult to arrive at a precise definition of her work. The County Council approved of help being given under the following general terms — "The home help should undertake domestic duties, family or household management only in the home and should not act as a 'sitter-in' other than to allow other members of the household to carry on their own work. Briefly, home help can attend in a household where there is sickness sufficient to require medical or nursing care; she cannot attend where a sick person is removed to hospital unless there is a child under school leaving age at home; she can attend the aged, mentally defective, and expectant of child, without stipulation as to sickness. The aged should generally be over 60 years of age; the mentally defective, such as have been reported to the Health Committee, and those expectant of child, would normally have some disability such as fatigue or varicose veins necessitating rest, or be the mother of young children. She should, as far as reasonably possible, give her time to domestic duties or to family or household management (as appropriate to the case) and not undertake the duties of a 'sitter-in'; some relaxation of this rigid distinction will be needed where the aged, particularly aged couples, partially or wholly bed-ridden, are concerned (but each departure should be specifically authorized by the Divisional Medical Officer." Of all the social services developed in recent years in Britain this receives the most general approval, particularly from the family doctor. In time, no doubt, it will develop into a profession with training and status (the National Institute of Houseworkers, Ltd. already do this); most of the work is now done by part-time workers recruited against the particular needs of scattered populations.

Nothing indeed shows developments of social medicine so clearly as the changes now taking place in Great Britain for the care and after-care of patients, whether in hospital or at home. The same trend of events is almost certain to take place in relation to the industrial worker. Medicine in the future can gain

immeasurably from the development of collaboration between the general practitioner, the hospital and the Medical Officer of Health and his staff. It would be wrong to suggest that this development is now in any sense universal or even uniform. An Australian, Dr. Collings, who recently visited these shores to study general practice under the Act, said (Lancet, 1, 567): "In practical terms . . . . such a relationship hardly exists. Often there is mutual animosity and distrust. The idea that the local authority services are complementary to the work of the general practitioner is in my opinion theoretical; in fact, these services are substitutes for some of the work which was once his responsibility but has long since passed from his hands." This must be true still of many parts (although the B.M.J. said "One must state flatly that the picture he gives of general practice in England today is inexact and unfair") and some years will elapse before the new arrangements work smoothly. Some are wondering whether this can ever be achieved short of a whole-time service. The unification of our service in one administrative machine (all-purpose health authorities) would no doubt immeasurably benefit this important line of progress.

APPENDIX

Agreement reached (August 1949) with a hospital management committee in an industrial area

Memorandum of agreed procedure to be adopted to ensure co-operation between the hospitals administered by the Rotherham and Mexborough Hospital Management Committee and the local health authorities of the West Riding County Council and County Borough of Rotherham in matters relating to the notification of the discharge and the after-care of patients discharged from hospitals, the notification of infectious diseases and of food poisoning, medical reports on school children, and social investigations.

Note: (a) Paras. (a) of Sections 1 and 2 below relate to patients residing in the area of the Medical Officer of Health, County Borough of Rotherham, and Paras. (b) of the same sections to patients residing outside the area of the County Borough of Rotherham.

(b) "The appropriate Medical Officer of Health" means the Medical Officer of Health of the Local Health Authority in whose area the patient resides.

(c) The term "hospitals" refers to those under the control of the Rotherham and Mexborough Hospital Management Committee.

1. Cases requiring Home Nursing

(a) Except in cases of emergency, at least 12 and preferably 24 hours' notice wherever possible must be given by hospitals to Superintendent Nurse, Home Nursing Service, Rotherham, on application forms supplied to hospitals, of discharge of cases requiring home nursing. Notice of emergency discharges to be given by telephone and confirmed in writing.

(b) Hospitals to telephone West Riding Divisional Medical Officer of Health of area in which patient resides with at least 12 hours' notice of discharge, and 24 hours' notice wherever possible. Emergency discharges to be notified by telephone and all discharges confirmed in writing.

2. Early discharge of Maternity Cases

(a) Except in cases of emergency, at least 12 and preferably 24 hours' notice wherever possible of early discharge of maternity cases must be given by hospitals to the Superintendent midwife. Notice of emergency discharges to be given to the Superintendent midwife by telephone, and confirmed in writing.

(b) Hospitals to telephone Divisional Medical Officers of Health of area in which patient resides with at least 12 hours' notice of discharge, and 24 hours' notice wherever possible. Emergency discharges to be notified by telephone and all discharges confirmed in writing.

(c) In view of the pressure on maternity beds, normal maternity patients cannot be retained beyond 14 days. If the patient's home conditions on admission are bad, the appropriate Medical Officer of Health will ensure that they are improved before the patient's discharge on the 14th day, or make suitable arrangements for her reception on discharge, on receipt of notice of discharge from hospitals as provided in paragraphs 2 (a) and 2 (b) respectively.

(d) Discharge of Premature Babies. Hospitals should notify the appropriate Medical Officer of Health of the impending discharge of premature babies and ascertain whether home conditions are satisfactory before the child is discharged. General information regarding the child's condition should also be furnished. No premature babies should be discharged unless in a physically fit condition, particularly as regards weight.

3. Infectious Diseases

(a) Notification of undue incidence.

Hospitals should inform the appropriate Medical Officer of Health immediately, in writing, of any undue incidence of infectious disease, whether notifiable or not, occurring in the hospital. A list of infectious diseases, in addition to notifiable diseases, of which notification is required from hospitals, is attached.

(b) Discharge.

The procedure for discharge of cases of infectious diseases is set out in circular letter SHMC/MO/83, dated 3.1.1949, from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, circulated to Medical Officers of Health and all Hospital Management Committees. The terms of this letter are:

(i) When cases of infectious disease are to be discharged to their own homes, the hospital must notify the Medical Officer of Health of the Local Health Authority in whose area the home is situated.

(ii) This is particularly important in those cases arising in general hospitals, where it is considered by the Medical Officer in charge of the case that simple isolation in the patient's own home is all that is necessary. In these cases, it is essential that the home conditions should be known, so that the risk of infecting other members of the household is negligible, and that the patient's condition is not prejudiced. Effort should normally be made to find accommodation in an isolation hospital, where nursing facilities are readily available, for all cases removed from a general hospital.

(iii) The notification procedure to be followed in all isolation hospitals is that the Local Authority must be notified as soon as possible of the admission and discharge of a case of infectious disease.

(iv) The appropriate Medical Officer of Health will ascertain the patient's home conditions on the receipt from infectious diseases hospitals of the notification of discharge.

4. Food Poisoning

In order that causative factors may be investigated immediately, all cases of suspected food poisoning or food poisoning should be reported forthwith to the appropriate Medical Officer of Health.

5. After-Care

All necessary details of cases requiring after-care, to be carried out by the local health authority, should be notified as soon as possible to the appropriate Medical Officer of Health, under confidential cover.

6. Child Health Service — Medical Reports

In all cases where it is desirable to provide or secure continued medical supervision, special educational treatment, or after-care, for pre-school and school children on their

dischare from in-patient treatment or termination of out-patient treatment at hospitals, the appropriate information as to discharge and medical report should be supplied to

(1) the Medical Officer of Health, Rotherham, or

(2) the appropriate Divisional Medical Officer of Health, as the case may be, provided that the previous consent of the child's parent or guardian to supplying this information is obtained by the hospital.

Information as to admission, discharge and medical reports of pre-school and school children should also be sent by hospitals to the family doctors concerned, where known.

7. Patient's Consent to Disclosure of Information

The consent in writing of the patient, or the parent or guardian of a child, must be obtained before any information regarding his or her illness and treatment in hospital is furnished to the appropriate Medical Officer of Health, or Home Nursing Service, and such information must be sent under confidential cover.

(Instructions to this effect have been received from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Ref.SHMC/MO/109 of 8.3.1949 and circulated to all hospitals together with form of consent for signature by patient, parent or guardian.)

8. Social Investigation for Hospitals

Reports on the home, other social circumstances, and background histories of patients will be supplied by the appropriate Medical Officer of Health when required to any hospital.

It is regarded as essential that the closest personal relationship and co-operation in health service matters should exist between hospitals and the local Health Authority's services, i.e. Medical Officer, District Nurses and Health Visitors.

Great care has been taken to ensure that the patient's consent is obtained for any information to be given to the health department and also to ensure that nothing should be done for any patient under the care of the family doctor without his agreement. The scheme is operated through the divisional health offices and the following instruction has been issued to them:

"In all cases (other than maternity cases discharged from Homes before termination of 14 days' lying-in) after the first visit and report to the general practitioner, no further visits will be made, or services performed, without the express permission of the general practitioner. He is primarily responsible for the medical care of the patient when discharged from hospital and it is of the utmost importance that he is consulted, and consents to the County services being provided, in each individual case.

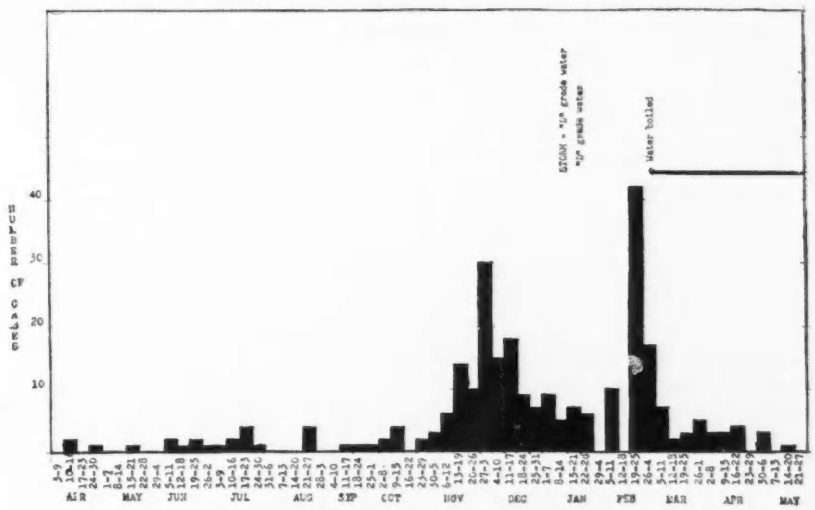
"Maternity cases discharged home before the end of the lying-in period can, of course, be dealt with as normal domiciliary midwifery cases.

"The preceding instruction will not be so interpreted as to prevent the immediate application of the County service in an emergency. A full report of the circumstances, with details of what has been done, should then be given to the general practitioner concerned."

Infectious Hepatitis in Army Installations in the Kingston Area

MAJOR R. D. BARRON, M.D., R.C.A.M.C.
Hygiene Officer, Central Command
Oakville, Ontario

THE fact that the Kingston area was the only area in Canada reporting an unusual prevalence of infectious hepatitis in 1949 to 1950 led to investigation in that regard. The reported incidence of infectious hepatitis in the area for the period April 3, 1949, to May 27, 1950, is shown in the graph. Here it is seen that following sporadic cases with a weekly incidence varying from none to 3 or 4 from April to October, 1949, there was a marked increase in November, with a peak of 30 cases in the week of November 27 to December 3; after this the cases fell off but remained distinctly above the previous level. Then in February there was another explosive outbreak, with 42 cases occurring in two days in the week of the 19th to 25th; the incidence then fell abruptly to 2, 3 or 4 cases per week and finally trailed off to none by the end of May. An autumnal outbreak developing on an endemic prevalence is not unusual, but the explosive outbreak in February is quite unusual; it was not anticipated and thus provided a further stimulus to investigation.



Infectious Hepatitis, Kingston Area, 1949-1950

Based on a paper presented before the Epidemiology Section at the thirty-eighth annual meeting of the Canadian Public Health Association, held in Toronto, June 12-14, 1950, in conjunction with the first meeting of the Ontario Public Health Association.

Fortunately in March, 1949, the consultant in medicine to the Director General of Medical Services had proposed an investigational routine for gastro-enteric disturbances occurring in the Central Command, as follows: (a) all cases to be admitted to hospital; (b) history to include notes on anorexia, abdominal pain, diarrhoea, liver tenderness or enlargement, splenic enlargement; (c) routine test of urine for bile for 5 days; (d) W.B.C. count, differential count and sedimentation rate; (e) serum bilirubin and icteric index on admission and repeated every five days until normal; (f) bromosulphthalein test and cephalin and cholesterol; (g) cases with negative laboratory findings not to be hospitalized over five days, other cases to be hospitalized as long as required at the discretion of the Medical Officer. This routine was thus in effect in three military hospitals in Central Command. As a consequence, 260 cases diagnosed as infectious hepatitis were admitted to the Kingston Military Hospital, April 1, 1949, to March 31, 1950, while only an occasional case was found by the same investigational routine among the troops served by the Toronto and Camp Borden Military Hospitals.

TABLE I

SYMPTOMALOGY

Symptoms	No. of Cases Showing Symptoms	Per cent of Total Cases
Malaise	193	74
Anorexia	192	74
Abdominal distress	214	82
Vomiting	99	38
Nausea	112	43
Fever on admission	75	29

TABLE II

CLINICAL FINDINGS IN 260 CASES

Clinical Findings	Showing No.	Findings %
Clinical jaundice	15	4.8%
Bile in urine	253	97%
Liver function tests		
Bromosulphthalein	14	5.4%
Icteric index		
Less than 5	89	34%
5-15	136	53%
Greater than 15	23	9%

The findings in the 260 cases are shown in Tables I and II. The symptoms are those usually found, but although only 15 of the 260 showed clinical jaundice, bile was found in the urine of 254. Without the routine test for bile, many of these cases would undoubtedly have been missed. As a control, testing was checked by doing a series of urinary bile tests on the surgical patients; none of these showed positive urinary bile.

The incubation period of infectious hepatitis is generally given as 15 to 40 days, and that of homologous serum jaundice or inoculation hepatitis, 60 to 120 days. However, 4 of a group of 15 nursing personnel (14 nursing orderlies and 1 nursing sister), who had not had previous contact in the Kingston area but had been moved to Kingston Military Hospital on February 25th to supplement the staff, developed hepatitis in 10, 12, 12 and 15 days. Whether these incubation

periods are shorter than usual or appear shorter because of the unusual opportunity for early recognition of the condition is a question.

The period from onset of symptoms to admission to hospital was relatively short in most of the cases, as shown in Table III. The age distribution, shown in

TABLE III

PRODROMAL PERIOD
FROM ONSET OF SYMPTOMS TO ADMISSION TO HOSPITAL

Prodromal Period in Days	No. of Cases	Percentage of Cases
1-3	193	74%
4-7	52	20%
8-10	7	3%
11-14	8	3%

TABLE IV

AGE DISTRIBUTION

Age	No. of Cases	Percentage of Cases
Under 20	117	45%
20 - 25	78	30%
26 - 30	37	14%
31 - 35	10	4%
36 plus	18	7%

Table IV, naturally differs from that seen in civil life on account of the different population involved, a high percentage being recruits or young soldiers-in-training in the schools or in training depots in the area.

While the vast majority of cases occurred in units in the Barriefield–Vimy area (approximately four miles east of Kingston), cases have also occurred among personnel living in the city of Kingston and in the Royal Military College. Early in the outbreak a few cases occurred in Picton, a camp 40 miles west of Kingston. However, investigation showed that all the latter group had visited Kingston or had been in-patients or out-patients of the Kingston Military Hospital. The source of cases is shown in Table V.

The period of hospitalization was short, due, it is believed, to the high proportion of non-icteric cases. In general, the cases with frank clinical jaundice had the longer hospitalization. Table VI shows the duration. The shortest period

TABLE V

Unit	No. of Cases	Percentage of Cases
RCS of S, Vimy	101	39%
RCEME School, Barriefield	105	40%
Royal Military College	23	9%
Kingston Military Hospital	10	4%
RCS of A (AA) Picton	9	3%
Others	12	5%

TABLE VI

DURATION OF HOSPITALIZATION

No. of Days in Hospital	No. of Cases	Percentage of Cases
1 - 5	39	15%
6 - 10	112	43%
11 - 15	60	23%
16 - 20	25	10%
20 plus	24	9%

was 3 days, the longest 55 days, the average 11 days; the total hospital days, 2,746.

Somewhat at variance with reports of other outbreaks of infectious hepatitis, these cases showed 13% from the officer and officer-cadet personnel, with 87% from other rank personnel.

Epidemiological Investigation

In an attempt to find some common factor as the background of these explosive outbreaks developing on an endemic prevalence, numerous avenues were explored. An investigation of a recent history of intravenous therapy and recent inoculation failed to reveal any relationship; messing arrangements were quite satisfactory and gave no suggestion of any causal relationship to the outbreak. Considerable pertinent information was obtained from investigation and study of the water supplies and sewage systems in the area. So, too, from an investigation of living conditions in barracks and quarters and from inquiries regarding infections amongst the civilian population and school population.

Local Water Supply

Barriefield and Vimy Camps are supplied by a common pumping station which draws water from the St. Lawrence River 4 miles down stream from the city of Kingston and the Royal Military College. Water is *not* filtered and is chlorinated only before it passes into the distributing system.

On November 23, 1949, while conducting the initial investigation, it was noted at the Kingston Military Hospital that water from the hospital taps showed a very heavy precipitate of sediment and silt. This was concurrent with a heavy two-day on-shore wind and storm. However, orthotolidine tests at the time showed .3 ppm residual chlorine at the pumping station.

During the month of January, a similar situation again occurred. On January 11, 1950, "D" class water was obtained from the Barriefield system, and an order to boil all water in the camp was issued. On January 14, "D" class water was again obtained at several points throughout the system. During this 3-day period, another severe wind storm was blowing. From January 17 onward, grade "A" samples were obtained. The boiling order was withdrawn January 19. No other substandard specimens had been obtained in this system. On January 14, residual chlorination was raised to .7 ppm at the pump-house. On February 28, following the explosive outbreak on February 24, an order was again put into effect requesting the boiling of all drinking water in the Barriefield, Vimy, and Royal Military College areas. This order was kept in effect until the installation of a filter system.

The decrease in the incidence of this infection is noted in relation to the periods during which water was boiled in the area. It also should be pointed out that although the residual chlorine concentration was high, it was not until boiling of drinking water was reintroduced that the incidence showed a rapid decline and remained relatively low.

The Royal Military College is located on a peninsula across the Cataraqui River from Kingston. It has an independent water supply which is filtered and

chlorinated at .5 ppm residual chlorination. However, investigation revealed that residual chlorination was not always maintained at this level due to lack of regular periodic testing.

The water supply of the city of Kingston is obtained from Lake Ontario at the westerly city limits. The supply is chlorinated but not filtered, and at times is known to contain a large amount of sediment and silt. Army units located within the city limits are supplied by this system.

Sewage Disposal

The city of Kingston discharges raw sewage directly into Lake Ontario along the city waterfront by a group of open trunk sewers, some 19 in number. The Royal Military College is half a mile across the Cataraqui River from Kingston and discharges raw sewage into the mouth of the Cataraqui River and Lake Ontario. Barriefield sewage is discharged into the Cataraqui River after being treated in settling tanks and the effluent chlorinated to a residual of .5 ppm chlorine. Vimy Camp sewage is discharged into the St. Lawrence River half a mile down stream from the Barriefield intake after treatment in Imhoff tanks and chlorination of the effluent.

Billets and Quarters

At the time of the November-December outbreak, some overcrowding of billets and quarters was found in the School of Signals (Vimy), at which time it was possible to trace in cubicles where doubled bed bunks in pairs were used the typical respiratory type of spread of infection. Correction of overcrowding was followed by a reduction in the incidence in that unit.

Infection Amongst Civilian Population

It was reliably reported by the Director of Queen's University health program, and the physicians of both the Federal Penitentiary and the Ontario Hospital, Kingston, that a similar symptom complex with and without jaundice was prevalent in the civilian population of the city, the university population and the inmate population of the penal institution, and that this condition has been endemic for a period of at least two years.

Laboratory Investigation

Through the courtesy of Dr. C. E. van Rooyen, School of Hygiene, University of Toronto, 25 specimens of serum of pre-icteric patients in Kingston Military Hospital were submitted to the following investigation. The sera after fractionation by high speed and ultracentrifugation were examined with the electron microscope and refractometrically. The electron microscope examination failed to reveal anything resembling virus particles, and the refractometric analysis by Dr. Angus Graham failed to disclose the presence of any abnormal components in infectious hepatitis sera as compared with normal sera. Suckling mice were inoculated subcutaneously, intraperitoneally and intracerebrally, as well as by mouth and intranasally with pooled specimens of sera. Though kept under observation for several weeks, they failed to show any evidence of infection or other pathological condition. Because of the importance of infectious hepatitis

to military hygiene and public health workers it is felt that, in spite of the negative laboratory findings in this regard, such studies should be repeated.

Control Measures

The control measures instituted in the control of infectious hepatitis in the Kingston area were:

(1) Rigid enforcement of barrack sanitation, particularly the avoidance of overcrowding (i.e., minimum of 600 cubic feet per person), dust control measures in sweeping, and the standard procedures for control of respiratory disease in barracks.

(2) Close check on hygiene and sanitation of kitchens and messes, with particular reference to dishwashing, messing, food handling and food handlers.

(3) Boiling of all drinking water during the periods of breakdown of the water treatment system and continuance of boiling until a new filter system was installed.

(4) In view of the breakdown of the water system during January 11-14, 1950, immunization of all service personnel and dependents with 3 doses of TABT.

(5) The ultimate installation of a filter system in the water treatment plant supplying Barriefield and Vimy areas.

Summary

The results of a survey of 260 cases of infectious hepatitis occurring in military camps in the Kingston area during a 12-months' period have been presented. The epidemiological facts offered as the possible causes of the increased incidence of infectious hepatitis in the area have been presented. The possibility that infectious hepatitis may be of both respiratory and gastrointestinal spread within a selected group has been suggested. The incidence of clinical jaundice in infectious hepatitis may be much lower than is usually anticipated. The incubation period of infectious hepatitis can be as short as 10-14 days. The spread of infectious hepatitis may be water-borne should the water treatment system break down in an endemic area. Boiling of drinking water appears to be a more effective method of controlling the water-borne spread of this disease than chlorination in the presence of much organic matter.

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NEW REQUIREMENTS FOR THE CERTIFICATE IN SANITARY INSPECTION (CANADA)

THE Annual Meeting of the Association, held in Montreal last May, adopted recommendations for the more adequate training of sanitary inspectors. These recommendations had received the approval of the Deputy Ministers of Health of the various provinces. One of the provisions of the new regulations relating to the granting of the Certificate in Sanitary Inspection (Canada) by the Association is the requirement of nine months of training. This training involves full-time work in an approved department of health and, if possible, a course of academic instruction extending over several months. As such courses will be available only to some of the candidates, the correspondence course provided by the Association will be continued. This course, which was introduced in 1942, has proved its usefulness, although it is an inadequate substitute for a formal course of instruction offered under the direction of a provincial department of health or a university or other institution.

Two courses for sanitary inspectors which offer full-time instruction are at present available in Canada. The University of Montreal provides a course which extends over a period of four months and is given at the School of Hygiene. The Ministry of Health of the Province of Quebec selects candidates to serve as sanitary inspectors and provides appointments in health units, arranging for the men to complete their training by attending the course of instruction at the University. Inspectors from the Department of Health of the City of Montreal and other candidates are also enrolled in the course. The period of training in Quebec meets fully the requirements for the Certificate in Sanitary Inspection (Canada). Examinations are conducted by the University of Montreal at the conclusion of the course. As these examinations fully parallel the examinations held by the Association, the written papers and the field inspection report are accepted, and the Certificate in Sanitary Inspection (Canada) is awarded to candidates who are successful also in an oral examination conducted by examiners named by the Association. The arrangements which now pertain in the Province of Quebec meet the needs for the training of sanitary inspectors both for the Ministry and for urban centres.

In Manitoba, the Provincial Department of Health and Public Welfare has provided, through its School of Instruction for Sanitary Inspectors, a ten-month course of training which combines supervised field experience with didactic instruction. Candidates are chosen from various parts of the Province, so that the needs of all the health units may be met. No difficulty has been found in interesting suitable candidates; the eleven members selected for this year's course were chosen from five times as many applicants. Although the course has been given on three previous occasions, this year's is the most extensive yet offered. The candidates attend instruction from 9 to 4 daily, five days a week. The course, which opened on June 15th of last year, terminates in April. In March the candidates will take the examinations for the Certificate in Sanitary Inspection (Canada), as will the candidates who will be completing the work in the University of Montreal. The course offered in Manitoba may well be considered by other provinces in providing for the training of sanitary inspectors. Its success is due in large measure to the enthusiasm and efficiency of Mr. Mark Flattery, C.S.I.(C.). With the assistance of members of the staff of the Department of Health and Public Welfare, and utilizing the services of members of various industries having a relationship to the Division of Environmental Sanitation, Mr. Flattery has been able to devise a very practical course combining lectures, laboratory demonstrations, and extensive field work.

In Saskatchewan and Alberta, as well as in certain other provinces, in-service training is given under the direction of the Provincial Department of Health.

Surveying the present arrangements, it is seen that there is need for at least one other centre which would offer a formal course of several months, as in the University of Montreal, or a longer course of planned in-service training such as that provided in the Province of Manitoba. Although several courses of formal instruction across Canada would be desirable, it must be realized that these courses can be provided only when the number of candidates warrants it. The problem of providing staff is a difficult one. Substantial progress in the training of sanitary inspectors has been made since 1935, when the Association introduced certification, and with the introduction of the requirement of nine months of training, a further advance has been made. As the need for training facilities is demonstrated, there is no question that the necessary courses will be provided, with the assistance of provincial departments of health. In using Federal health grants for the improvement of public health services in Canada, the work of the sanitary inspector has not been overlooked, and it can confidently be expected that, with the defining of the requirements of training, additional facilities will be provided.

ABSTRACTS OF PAPERS PRESENTED AT THE NINETEENTH ANNUAL CHRISTMAS MEETING OF THE LABORATORY SECTION, CANADIAN PUBLIC HEALTH ASSOCIATION, ROYAL YORK HOTEL, TORONTO DECEMBER 17 AND 18, 1951

The Isolation and Testing of Bacteriophages for C. Diphtheriae.

J. FAHEY, *Department of Hygiene and Preventive Medicine, University of Toronto.*

FOUR PHAGES were isolated from lysogenic strains of *C. diphtheriae*. From these, fifteen mutant phages were obtained. The majority of these mutant races showed an increased host range.

Thirty-five *C. diphtheriae* phages, including those isolated by Toshach in 1949, were tested on 125 strains of *C. diphtheriae*. One hundred and twenty-two (97.6%) of the strains were lysed by one or more of the phages. Three of the phages with promising host ranges were tested on an additional 35 strains and lysed 30. There was no correlation between type of *C. diphtheriae* and the pattern of phage sensitivity.

Testing of these strains for lysogenicity has revealed that approximately 40% were associated with phage.

Report on Two Cases of Leishmaniasis in Children.

T. E. ROY, N. M. WRONG and W. L. DONOHUE, *Departments of Bacteriology, Dermatology and Pathology, Hospital for Sick Children, Toronto.*

TWO CASES of leishmaniasis are presented.

The first, a Sicilian child with visceral leishmaniasis, was admitted with fever, loss of weight, anemia, and splenohepatomegaly. Diagnosis was based on stained films from bone marrow which showed Leishman-Donovan bodies, and was confirmed by cultures which grew the flagellated form of *L. donovani*. Apparent recovery followed treatment with neostibosan.

The second case, one of cutaneous leishmaniasis of one year's duration, was also in an Italian child. The clinical diagnosis was confirmed by the demonstration of *L. tropica* in both histological preparations and cultures from biopsy material.

Problems relating to diagnosis and the need for awareness among laboratory workers of the possibility of this infection in immigrants are discussed.

Review of a Public Health Mycology Service.

J. FISCHER, *Division of Laboratories, Department of Health of Ontario, Toronto.*

RESULTS OF the last five years of the Mycology Service of the Central Laboratory of the Department of Health of Ontario are reviewed. The importance of including this type of work in a public health laboratory service is stressed.

Animals as Sources of Infection for Superficial Dermatomycoses.

F. BLANK, *Department of Bacteriology and Immunology, McGill University, Montreal.*

IT IS WELL KNOW that cats and dogs may transmit microsporosis caused by *Sabouraudites canis* to human beings. Favus of mice may also occur in man by direct or indirect transmission. Many Ctenomyces species infect both animals and man, and are transmitted by

direct contact. The most important species involved is *Ctenomyces granulosus*. Species of the *Trichophyton faviforme* group are often found in cattle, horses, dogs and cats, and are easily transmitted to human beings. Mycological and epidemiological investigations of dermatophytes isolated from animals and transmitted to man are now in progress.

Action of Young Culture Filtrates of S. Typhosa on the Experimental Infection Produced with Washed Cells of the Same Microorganism.

A. FRAPPIER, L. SHERMAN-WARCZEWSKI and S. SONEA, *Institute of Microbiology and Hygiene, University of Montreal, Montreal.*

THE MORTALITY is higher among mice infected with washed cells of S. *typhosa* when young culture filtrates of the same microorganism are added than when such filtrates are replaced, in the controls, by a filtrate of the original sterile culture medium. The former filtrates are not toxic and differ in their composition from other known pathogenizing factors. A few hours after intraperitoneal inoculation, the number of bacilli present in the exudate is conditioned by the action of the filtrates.

The same filtrates seem to influence the development of the infection with other species of microorganisms, such as other enterobacteriaceae.

The Incidence of Trichinosis in Swine in the Maritime Provinces.

J. F. FRANK, *Division of Animal Pathology, Science Service, Department of Agriculture, Branch Laboratory Maritime Area, Sackville, N.B.*

IN THE LAST DECADE several cases of trichinosis in humans have been reported in the Maritime provinces. As there was little information available on the incidence of trichinosis in swine in this area, a survey was undertaken to examine swine originating in the three provinces of New Brunswick, Nova Scotia, and Prince Edward Island for the presence of trichinellid larvae.

Over a period of approximately 16 months, samples from 1,002 diaphragms were examined both by the direct microscopic method and by the digestion technique. These samples were taken from swine in all the important swine-raising areas of these provinces. Only four (0.4%) infected swine were found. Three of the positive samples were detected by the direct microscopic method and all four were detected by the digestion technique. The four infected swine came from three different premises in one section of Nova Scotia. The infection at two of the premises appeared to be sporadic but at the third, where two positive swine were found, there was a definite cycle of infection, as raw pork offal from swine butchered on the premises was fed to the swine on this farm.

Soluble Protective Antigen of Salmonella Typhosa.

G. G. WATERS and P. J. MOLONEY, *Connaught Medical Research Laboratories, University of Toronto.*

A SOLUBLE ANTIGEN has been prepared from a suspension of *Salmonella typhosa* which may be sterilized by filtration through a Seitz pad. Certain properties of this antigen will be discussed.

A Preliminary Report on a Study of Pigmented Mycobacteria.

F. PRISSICK and A. M. MASSON, *Children's Memorial Hospital and Department of Bacteriology and Immunology, McGill University, Montreal.*

THIS REPORT describes the investigation of fourteen strains of pigmented Mycobacteria which have been isolated from patients in the following instances:

Enlarged cervical glands (closed), 10
Empyema, 2
Bronchoscopy fluid, 1
Tissue from knee joint, 1

Morphological, cultural and biochemical characters of these strains have been studied and compared with type culture *Mycobacterium tuberculosis* H-37.

In addition, experiments to evaluate their pathogenicity for laboratory animals are in progress. The diagnostic problems introduced by these findings into the routine culture procedures are discussed.

An Appraisal of the Safety of Various Canadian Soft-curd Cheeses Made from Unpasteurized Milk.

F. S. THATCHER and C. J. COUTU, *Microbiology Section of the Food and Drug Laboratories, Department of National Health and Welfare, Ottawa.*

THIS PAPER reports a bacteriological investigation of a number of Canadian soft-curd cheeses and of the sanitation of their places of manufacture. The presence of coagulase-positive Staphylococci, *Streptococcus agalactiae*, fecal streptococci, *E. coli*, *Paracolobactrum*, and *Brucella abortus* in raw milk as received at the factory, in curd, and in market cheese is discussed in relation to the Food and Drugs Act.

Vaccination of Guinea Pigs with Water-Oil Emulsions and Saline Suspensions of Killed Brucella Abortus.

RONALD GWATKIN and LUCIJA DZENIS, *Division of Animal Pathology, Department of Agriculture, Animal Diseases Research Institute, Hull.*

BASED ON THE ABSENCE of splenic lesions and failure to isolate *Brucella abortus*, heat-killed oil vaccine and ether-killed oil vaccine protected 40% and 50% of the vaccinated guinea pigs. Saline suspensions containing the same dose of bacteria protected 16.6% and 18.7% of similar groups of guinea pigs. The infective dose by eye was such that all non-vaccinated animals were infected, as shown by spleen lesions and heavy growths of *Brucella abortus* on spleen cultures. Biometric analysis indicates that the heat-killed oil and saline suspensions are not significantly different. The oil suspension, however, is significantly different from the saline suspension at the 5% level of significance for the ether-killed vaccine. If absence of agglutinins be considered as one of the criteria of freedom from infection, any protection afforded these guinea pigs was very slight.

Some Observations on Bacterial Resistance to Antibiotics.

A. M. MILLER and F. H. SHERLOCK-HUBBARD, *Division of Laboratories, Department of Health of Ontario, Toronto.*

REPORT FROM the Central Laboratory of the Department of Health of Ontario for the seven-year period 1945 to 1951 inclusive. Number of sensitivity tests reviewed total 7,328.

Resistance to penicillin on the part of pathogenic staphylococci has shown a marked increase over the seven-year period. Resistance to penicillin has not been found to have developed markedly on the part of other pathogenic gram-positive cocci.

Comparative resistance to the broad spectrum antibiotics (Aureomycin, Terramycin, Chloromycetin) on the part of usually sensitive organisms appears to have been developing during the last two years. This is true of both gram-positive and gram-negative organisms. Developing resistance of strains of *M. tuberculosis* to streptomycin is also shown.

A Simplified Method for the Purification of Antitoxins.

J. DEREPENTIGNY, A. BORDUAS, L. FORTE and P. MAROIS, *Institute of Microbiology and Hygiene, University of Montreal.*

TETANUS AND DIPHTHERIA ANTITOXINS have been purified by a simplified modification of Pope's method.

The new procedure includes digestion by pepsin, denaturation by heat, precipitation by sodium sulfate, and subsequent elimination of the salt by crystallisation at low temperature. Precipitates are separated by centrifugation. The final precipitate of antitoxin is kept

at +4°C. for 24 hours. Na_2SO_4 crystallizes out, and the liquid phase, which contains the antitoxin, is decanted and clarified by high-speed centrifugation.

The purified antitoxin contains about 2.4% Na_2SO_4 (isotonic solution equivalent), and is free from pyrogens. The technique is applicable to both diphtheria antitoxin and tetanus antitoxin: results are identical and reproducible, according to animal or flocculation tests.

The concentration factor (20% solids) is 6; purification factor, 3.2; yield, 50%. Antitoxins have been obtained with a purity of 40,000 units/gram of nitrogen-containing substances.

A Specific Approach to the Serodiagnosis of Syphilis.

ROBERT A. NELSON, Jr., *Naval Medical Research Institute, Bethesda, Maryland, U.S.A.*

A PRESENTATION concerning the Treponema Pallidum Immobilization Test (T.P.I. Test).

Bacteriological Safety Devices.

A. G. WEDUM, *Chief, Safety Division, Chemical Corps Biological Laboratories, Camp Detrick, Frederick, Maryland, U.S.A.*

THE INFECTIOUS HAZARDS associated with a number of common laboratory techniques will be illustrated by (a) the film "Infectious Hazards of Bacteriological Techniques" and (b) lantern slides. The conclusion from examining these slides is that all bacteriologists would be infected by the organisms studied if the organisms were sufficiently invasive and virulent. The most important device to eliminate or minimize bacteriological hazards is a suitable ventilated safety cabinet. Other devices which will be discussed and illustrated by slides include pipettors, ventilated head hoods, the microbincinerator, the safety tray rack, the carboxoclave, and various air samplers.

Antigenic Typing of Coxsackie Viruses Isolated in Ontario, in 1949 and 1950.

A. J. RHODES, EINA M. CLARK, DOROTHY S. KNOWLES and FRANK T. SHIMADA, *Connaught Medical Research Laboratories, University of Toronto.*

DURING THE PAST THREE YEARS, over 80 specimens of stools from patients suspected to be suffering from poliomyelitis have been inoculated in suckling mice to test for Coxsackie virus and in rhesus monkeys to test for poliomyelitis virus. As shown in Table I, 17 strains of Coxsackie virus have been recovered from the 82 persons tested.

TABLE I

CLINICAL POLIOMYELITIS: CANADA, 1949 AND 1950

Results of Tests for Presence of Coxsackie and Poliomyelitis Viruses in Stools*

Clinical Diagnosis	Persons Investigated	Excreting only Coxsackie	Excreting only Poliomyelitis	Excreting both Viruses	Percentage Excreting Coxsackie	Percentage Excreting Poliomyelitis
Paralytic poliomyelitis	21	0	15	4	19% (4/21)	90% (19/21)
Meningeal and abortive poliomyelitis	54	8	7	2	18% (10/54)	17% (9/54)
Family contacts	7	1	1	2	(3/7)	(3/7)
Total number studied	82	9	23	8	21% (17/82)	38% (31/82)

*All specimens collected within 10 days of onset and prepared for animal inoculation by ultracentrifugation.

Two additional strains of Coxsackie virus were recovered from sewage. Typing of 14 of these 19 strains has now been carried out by means of the virus neutralization technique. The locally isolated strains were first passaged in mice until they appeared established, and virus pools were then prepared. Antisera to the 13 standard types of virus recognized by Dalldorf were prepared in adult mice. The locally isolated strains were then typed by inoculating groups of suckling mice with mixtures of virus and serial dilutions of the known type sera. It was thus possible to determine the antigenic types of the unknown strains. The results of these experiments are summarized in Table II.

TABLE II

Antigenic Types of 14 Strains of Coxsackie Virus Isolated in Ontario in 1949 and 1950

Year and Source of Strains	Type Determined by Virus Neutralization Tests with Local Virus and Type Sera														
	Group A											Group B			
	1	2	3	4	5	6	7	8	9	10	Untyped	1	2	3	Untyped
1949 cases of poliomyelitis (Ontario)		4													
1950 sewage, Toronto		1			1										
1950 cases of poliomyelitis (Toronto)		1					1	3			1	1			1
Total (14)		6			1		1	3			1	1			1

Attention is drawn to the occurrence of at least 5 different types of Coxsackie virus in Toronto in 1950. The typing of Coxsackie viruses is of interest from the point of view of the epidemiology of these infections. Further, as many outbreaks of poliomyelitis are mixed outbreaks, the typing of Coxsackie viruses may afford a delicate means of tracing the spread of poliomyelitis infection through a community.

The Serological Pattern of the 1950-51 Influenza Strains in Canada.

GEORGE DEMPSTER and B. K. BUCKNER, *Connaught Medical Research Laboratories, University of Toronto.*

DURING THE 1950-51 influenza epidemic in Canada we isolated 39 strains of influenza virus in Ontario. These proved to belong to the A-prime sub-group. The strains were obtained from cases occurring in widely separated parts of Ontario. Antisera have been prepared against representative strains and cross-haemagglutination inhibition tests performed. The Ontario strains have been compared with a strain obtained from the U.K. epidemic occurring in the same year and also with a Swedish strain isolated at that time. The strains appear to be related to, but not identical with, the standard FM1 strain.

Polarography as a Possible Aid in the Laboratory Diagnosis of Poliomyelitis.

J. PALOWSKI, L. MORRISSEY, and N. LABZOFFSKY, *Division of Laboratories, Department of Health of Ontario, Toronto.*

THIS IS A preliminary report on investigation into the applicability of polarography to the laboratory diagnosis of poliomyelitis.

During the 1951 epidemic of poliomyelitis 500 cerebrospinal fluids from cases of poliomyelitis and other conditions were analysed polarographically. Polarographic curves from cases of poliomyelitis were invariably much higher than from other conditions. It was noted further that the height of the curve was apparently not entirely dependent on the total quantity of protein but rather on its nature.

Mumps Infectivity Studies in Hamsters.

MURIEL BURR and F. P. NAGLER, *Laboratory of Hygiene, Department of National Health and Welfare, Ottawa.*

HAMSTERS, infected by the intranasal route with an egg-adapted strain of mumps virus, show evidence of pathological changes and virus multiplication in their lung tissues. Studies of antibody response to mumps virus in these animals are presented.

Failure of the Haemagglutination Test to Differentiate Between Types of Tuberculin.

PAUL BOULANGER and HERMAN KONST, *Division of Animal Pathology, Dominion Department of Agriculture, Animal Diseases Research Institute, Hull.*

AN ATTEMPT was made to apply the haemagglutination test of Middlebrook and Dubos in determining the potency and specificity of different lots of tuberculin. The results were compared with those obtained in intradermal titrations in guinea pigs sensitized with the bovine and avian types of tubercle bacilli, and with Johne's bacillus. The haemagglutination technique appears to have no advantages over the latter method of standardization.

Clostridium Botulinum, Type E.

C. E. DOLMAN and HELEN CHANG, *Connaught Medical Research Laboratories (Western Division), and Department of Bacteriology and Immunology, University of British Columbia, Vancouver.*

ABOUT 14 TYPE E strains are known to have been isolated over the past 15 years in various countries—6 in Russia, 4 in Canada, 3 in the United States, and 1 in France. Twelve of these strains were implicated in human botulism episodes, and in all save one instance, some form of fish was the vehicle. Experiments were devised to throw light on this apparent predilection of type E strains for fish products. Among the more important contributory factors would seem to be the low thermal resistance of type E spores and toxin; the ready production of type E toxin in uncooked fish; and the capacity of type E strains to survive for several days in both sea and fresh water.

As judged by their agglutination reactions, type E strains are divisible into at least 3 serological sub-types. Some evidence of toxigenic heterogeneity within the type was afforded by cross-neutralization experiments.

Lignin Reaction and Antituberculous Activity of PAS and Derivatives.

C. O. SIEBENMANN and A. ZUBRYS, *Connaught Medical Research Laboratories, University of Toronto.*

THE DEEP orange colour which develops when a solution of p-amino-salicylic acid (PAS) comes in contact with wood fibre is due to the reaction of the amino group with lignin. Practical use of this reaction was made in the form of a spot test carried out on unpurified paper from which lignin had not been removed. In determining for a number of PAS

derivatives the tuberculostatic activity against the H37Rv strain grown in Dubos' fluid medium, it was found that only those compounds which in presence of dilute hydrochloric acid give a positive lignin colour test show a marked antituberculous action. This suggests that within the group of substituted 4-amino-2-hydroxybenzoic acids the presence of a reactive, free or substituted, amino group may be essential for effective tuberculostatic activity.

Among the twelve compounds prepared are two formaldehyde condensation products of PAS. The first does not react with lignin and shows little *in vitro* and no *in vivo* activity. The second, which gives a clear-cut lignin reaction, is of low toxicity and has a marked tuberculostatic action against the H37Rv strain. Its antituberculous activity in mice approaches that of PAS.

NEWS

Manitoba

NURSING ASPECTS OF ABC WARFARE was the theme of a four-day institute held at Deer Lodge Hospital, Winnipeg, November 20th to 23rd. This institute was conducted by an instruction group from the Department of National Health and Welfare. Local arrangements were carried out by a committee called together by the Manitoba Association of Registered Nurses. Phases of the course included biological effects of radiation, atom bomb phenomena, mass feeding of infants, first aid and hospital care and emergency organization. The institute was attended by the nursing consultants of the Provincial Department of Health and Public Welfare and by senior nurses of the local health units who will conduct courses for registered nurses in their particular areas. The registered nurses will, in turn, give a modified course of instruction to the general public.

C. L. FRANCIS, supervisor of the Social Service Section, Research Division, Department of National Health and Welfare, visited Manitoba for talks with public health officials on laboratory and x-ray units and prepaid medical care. He also talked with two municipal doctors in Woodlands and Stonewall, and inspected the laboratory and x-ray unit in Selkirk.

THE HON. IVAN SCHULTZ, Minister of Health and Public Welfare, left in October for a two-month visit to England, Scotland, Denmark, Holland and Norway. He observed medical-care plans in operation in those countries.

ROGER CHRISTIANSON, sanitary inspector, has returned to the Division of Environmental Sanitation after six months' leave of absence with the Canadian Army at Camp Borden, and is being posted to the office of the District Sanitary Engineer in Brandon.

DR. MORLEY ELLIOTT, president of the Canadian Public Health Association, attended the annual meeting of the American Public Health Association, held in San Francisco October 29th to November 1st. Dr. Elliott is the Deputy Minister of the Manitoba Department of Health and Public Welfare.

T. LACKIE, sanitary engineer, joined the Bureau of Public Health Engineering on December 1st. He will direct his attention particularly to stream pollution in Manitoba. Before going to Toronto for a postgraduate degree in sanitary engineering, Mr. Lackie worked with the Bureau of Environmental Sanitation on a study of rural school sanitation.

Ontario

RECENT APPOINTMENTS to the staff of the Ontario Department of Health follow:

FREDERICK A. EVIS, M.D., D.P.H., of Toronto, to fill the newly created position of Executive Assistant to the Minister. Dr. Evis has a unique combination of degrees in arts, law, medicine, and public health, and is also a diplomate of the National Board of Medical Examiners for the United States of America. In addition he has specialized knowledge in the field of State-controlled medical and hospital insurance schemes, plus considerable practical experience in organization and administration.

GEORGE W. MILLER, M.D., D.P.H., to the Health Department's Venereal Disease Control Branch. Dr. Miller's previous posts included Assistant Director of the World Health Organization 1949-51, Medical Officer of Health of the Northumberland-Durham Health Unit 1945-49, Director of Medical Services in the Royal Indian Navy 1942-45, and Deputy Public Health Commissioner for India 1941-42.

ROBERT M. GRAINGER, D.D.S., M.Sc. (Dent.), D.D.P.H., to the Medical Statistics Branch. Dr. Grainger is in charge of dental statistics and general dental research. During 1950 he was a Research Fellow of the Faculty of Dentistry, working on a Public Health Research Grant.

DOCTOR EVIS spoke on "Public Relations" at the seventh regional conference of sanitary inspectors (Region No. 3), held at Guelph on December 12.

A CHEST X-RAY SURVEY of provincial civil servants employed in the Parliament

Buildings and at the Division of Laboratories, Toronto, was undertaken by the Department of Health's Division of Tuberculosis Prevention on December 18 and 19.

DURING THE RECENT MEETING in Toronto of the Laboratory Section of the Canadian Public Health Association, a group of physicians and technicians toured the central laboratory of the Division of Laboratories of the Ontario Department of Health. They were welcomed by the Honourable Mackinnon Phillips, Minister of Health, who told the visitors that no governmental agency in the world provides a laboratory service as good as that of Ontario. In addition to a central laboratory, the Division operates ten regional branch laboratories, six subsidized branch Laboratories, and one serological laboratory. During 1951 the Division made more than 1,600,000 individual examinations, with 97 per cent of the work being done free of charge as a service to the public through the medical profession.

During his short address the Minister presented Mr. Lawrence Brydson, a senior laboratory technician, with a service pin in recognition of twenty-five years' faithful service with the central laboratory.

Quebec

MR. M.H. MCCRADY, B.Sc., Chief of Laboratories, Division of Laboratories, Quebec Ministry of Health, was elected vice-president of the American Public Health Association, at the seventy-ninth annual meeting, held in San Francisco, October 29 to November 2. This distinction is a tribute to the forty years of meritorious service rendered by Mr. McCrady to public health in the Province of Quebec.

At the same meeting, Dr. Maurice Saint-Martin, chief bacteriologist, and Mr. J. M. Desranleau, associate bacteriologist, of the Laboratory of Bacteriological Diagnosis, received the title of "Fellow" of the American Public Health Association.

Fellowship for Study of Problems of Old Age

THE EASTERN CANADA REGION (Ontario and Quebec) of the American Federation of Soroptomist Clubs is offering to a woman a fellowship of $1,500 for the study of problems concerned with old age. This study, to be undertaken in 1952-53, is to cover a period of at least six months, and longer if possible. The study project must be approved by the committee in charge of the awarding of the fellowship.

The fellowship is open to any woman residing in Canada (preferably in Ontario or Quebec) whose background of education and experience has prepared her for a study of old-age problems which might be in such a field as architecture, medicine, nursing, nutrition, social work, etc. The applicant must agree to work in Canada, preferably in Ontario or Quebec, for at least one year following the completion of her study period. Application forms may be secured from Miss Catherine Faragher, Secretary, Eastern Canada Region, American Federation of Soroptimist Clubs, 28 High Park Avenue, Toronto 9, Ontario.

British Columbia

DR. H. A. F. HUMMEL, who recently joined the Division of Preventive Dentistry in the Provincial Department of Health and Welfare, has been appointed to the Central Vancouver Island Health Unit. Dr. Hummel is a graduate of Leeds University School of Medicine and before accepting his present position he served with the Metropolitan Health Committee of Vancouver.

DR. H. S. STALKER, former superintendent of Tranquille Sanatorium, has been appointed superintendent of the Pearson Tuberculosis Hospital.

DR. F. O. R. GARNER, until recently director of the Victoria Unit of the Division of Tuberculosis Control, has been appointed medical superintendent of the Tranquille Sanatorium.

A COURSE ON ADMINISTRATION in the Public Health Program is being presented jointly by the Extension Division of the University of Columbia and the B.C. Branch of the Canadian Institute of Sanitary Inspectors. The course is being given in the evening at the Vancouver Normal School and is attended by thirty-five sanitary inspectors. It comprises a series of lectures by specialists in public health administration and related fields.

SENIOR PUBLIC HEALTH NURSES attended a two-day meeting in Cloverdale in the early part of December. Discussions of the tuberculosis program, the Wetzel grid, and the home-care program were included on the agenda.

EMPLOYMENT SERVICE

Advertisements regarding "positions available" and "personnel available" will be published in from one to three consecutive issues, depending upon the requirements of the agency or person concerned. They are limited to seventy words or less, with a confidential box number if desired. There is no charge for this service to members of the Association. Health agencies are charged a flat rate of $10.00 for the advertisements (up to four consecutive issues) and for the service. The rate for non-members is $5.00. The service includes confidential clearing of information between prospective employer and employee if desired.

Vacant: Position of Director, Maternal and Child Health Service (including Nutrition Services). Program of well-child clinics, crippled children, school lunches, health education. Salary $5952-$6696, which includes current monthly bonus of 24%—annual increase $240. Car and travel allowance. Superannuation plan. Three weeks' holidays with pay. Generous sick-leave plan and group hospital insurance. Duties to begin May, 1952. Qualifications: preferred postgraduate training of at least one year, recognized by the Royal College of Physicians and Surgeons of Canada as leading to certification in the specialty indicated. Experience in public health, pediatrics and obstetrics. Further information and applications may be procured from the Civil Service Commission, P.O. Box 906, Fredericton, New Brunswick. 12/

Department of Health, Newfoundland: The Newfoundland Department of Health requires Registered Nurses for staff duty in 30-bed hospitals. Complete maintenance and uniforms are provided, as well as cost-of-living bonuses and twenty-four working days' annual vacation. Transportation expenses to Newfoundland are paid for a one-year contract. Return expenses are paid also for two-year contracts. For further particulars apply to The Director of Departmental Nurses, Department of Health, St. John's, Newfoundland, Canada.

Public Health Nurses for generalized program with health unit. Minimum salary $2,200, with allowance for experience, and annual increments of $120. Cumulative sick leave plan. Pension plan and Blue Cross hospital plan available if desired. Interest-free loans available for purchasing car if necessary. Apply to A. E. Thoms, M.D., Director, Leeds and Grenville Health Unit, Victoria Building, Brockville, Ontario.

Medical Officer of Health: Applications are invited from graduates in medicine who have postgraduate training in public health for the position of Medical Officer of Health of the City of Kingston. Salary will be according to experience and qualifications. Part-time teaching at Queen's University is possible for a suitably qualified applicant. T. J. McKibbin, Secretary, Board of Health, Kingston, Ontario. 1/

Medical Officer of Health Available: Danish subject, M.D. Copenhagen, age 43. Fourteen years' training in surgery, internal medicine, epidemiology, tuberculosis, bacteriology. Chief Medical Officer, Hammerjest, Norway, 1945–46; Tuberculosis Officer, Health Officer, 1946–49, Hong Kong, British Colonial Services; Corps Surgeon, St. John's Ambulance Association, 1946–48; 1949—, Health and Medical Officer in WHO; 1950–51, Health and Medical Officer in Korea (WHO—attached to the American 8th Army with the rank of Colonel). Henry Meyer, M.D., c/o World Health Organisation, Geneva, Switzerland.

Public Health Nurse required for generalized program in semi-urban community. Salary $2200–$2700, adjusted according to experience, with annual increment. Transportation allowance. Usual employee benefits. Apply to: Dr. W. K. Fenton, Medical Officer of Health, Township of Etobicoke, 4946 Dundas Street West, Islington, Toronto 18.